

HP 2100S SCSI RAID Controller User Guide



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About This Guide

This guide provides step-by-step instructions for installation, reference information for operation, and troubleshooting for the HP 2100S SCSI RAID Controller.

Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots server hardware. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Important Safety Information

Before installing this product, read the *Important Safety Information* document included with the server.

Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions:



WARNING: This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.



This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.



This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure



This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents essential information to explain a concept or complete a task.

NOTE: Text set off in this manner presents additional information to emphasize or supplement important points of the main text.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Technical Support

In North America, call the HP Technical Support Phone Center at 1-800-652-6672. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored. Outside North America, call the nearest HP Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the HP website (www.hp.com).

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP Website

The HP website has information on this product as well as the latest drivers and flash ROM images. You can access the HP website at www.hp.com.

Authorized Reseller

For the name of your nearest authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers.

Reader's Comments

HP welcomes your comments on this guide. Please send your comments and suggestions by e-mail to ServerDocumentation@hp.com.

Introduction

Read This First

Before you begin installing your new Adaptec controller, please take the time to read this chapter. This chapter is an important guide to the rest of the documentation and provides a summary of the installation process.

About the Documentation

The complete documentation set for the Adaptec SCSI RAID product line consists of three parts:

- *HP 2100S SCSI RAID Controller User Guide* (this book), which contains information that helps you to configure and install your Adaptec SCSI RAID controller.
- *Storage Management Software User's Guide*, which describes how to use the Storage Manager on ROM (SMOR) utility, and the RAIDUTIL command line utility. This can be obtained at www.adaptec.com
- *Storage Manager Online Help*, which contains information about using the Storage Manager software, using SCSI devices, and creating disk arrays. The Storage Manager online help information contains both topical and pop-up helps for Storage Manager and RAID concepts.

System Requirements

All Adaptec SCSI RAID controllers are PCI 2.2 compliant and are designed to operate in host systems that comply with revision 2.2 of the PCI Local Bus Specification.

Adaptec SCSI RAID controllers are also multifunction PCI devices. The host system must be able to properly configure multifunction PCI devices, where one of the devices is a bridge.

You must use cables designed for Ultra160 SCSI and active termination for your SCSI bus.

Working with Electricity

Any device that uses electricity must be treated with caution. Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- **Do not** perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Before working on the system, unplug the power cord.
 - Disconnect all power before doing the following:
 - Installing or removing a chassis
 - Working near power supplies
- **Do not** work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit. Always check.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, or missing safety grounds.

Preventing Electrostatic Discharge

To prevent electrostatic discharge, refer to Appendix B, “Electrostatic Discharge.”

About Your New Controller

Introduction

Adaptec SCSI RAID products incorporate the latest intelligent controller technology to deliver optimum performance for desktop systems, file servers or multiuser host systems.

IMPORTANT: ECC-protected cache is available only if you use Adaptec Cache Memory Modules or qualified ECC memory from a manufacturer listed on the Adaptec website.

- Adaptec SCSI RAID controllers support RAID 0, 1, 5 and multilevel RAID (0/1 and 0/5). The controllers support a maximum of 128 MB of onboard cache. Error Correcting Code (ECC) protection for cache memory is available when ECC memory is installed.
- Cache Memory Modules provide 32 MB, 64 MB, or 128 MB of ECC-protected SDRAM disk cache for SCSI RAID controllers.

Adaptec SCSI RAID Feature Overview

Adaptec SCSI RAID controllers include:

- Support for I2O OSMs provided by major operating system vendors; Adaptec provides drivers for most operating systems

For a list of drivers supplied by Adaptec, refer to Chapter 4, “Installing Adaptec SCSI RAID Software.”

- Certifications for major operating systems, including Novell NetWare, Microsoft Windows NT, and Windows 2000
- Support for a variety of SCSI devices, including hard disk, tape, CD-Recordable, CD-ROM, Magneto-Optical drives, jukeboxes and scanners
- Local and remote configuration, array status, and I/O monitoring using Adaptec Storage Manager software
- Operating system independent configuration and RAID creation using the Storage Manager on ROM (SMOR) utility
- Support for SCSI-1, SCSI-2, and SCSI-3 devices with active termination
- ASPI protocol support for third-party applications and utilities
- Flash ROM for easy upgrades of controller firmware, I2O BIOS and SMOR
- Event logging
- Predictive caching that analyzes disk read requests made by the host to determine whether they are part of a pattern

If a pattern is detected, the controller uses the pattern to predict which data the host is likely to request in the near future, then reads this data into the cache.

- Intelligent hot spare that automatically replaces a failed drive with a designated hot spare drive

When multiple hot spares are available on a controller, the intelligent hot-spare algorithm picks the best one based on capacity and bus location. RAID 1 and RAID 5 arrays are rebuilt automatically using the new drive.

DC Power Requirements

- Voltage: 5V \pm 5%
- Ripple and noise: 50 mV peak-to-peak maximum
- 2100S current (typical): 3.4A
- Memory module current (typical): 0.2A

Environmental Specifications

NOTE: Forced airflow is recommended but not required.

- Ambient temperature (operating): 0°C to 50° C (32°F to 122°F)
- Relative humidity (operating): 10% to 90% non-condensing
- Altitude (operating): 3,000 meters (10,000 feet)

Cache Memory

IMPORTANT: You must have a minimum of 32 MB of cache installed. If ECC protection is required you must use ECC Cache Memory Modules or qualified memory from a manufacturer listed on the Adaptec Web site.

Adaptec SCSI RAID controllers support up to 128 MB of cache SDRAM memory in the controller.

If you use third-party memory in the controller, the memory must be 100 MHz SDRAM, 168-pin DIMMs. Capacities can be 32 MB, 64 MB, or 128 MB. Third-party ECC DIMMs must be from a qualified manufacturer.

For a list of memory types and manufacturers that have been approved by Adaptec, refer to

www.adaptec.com

2100S Features

Adaptec SCSI RAID 2100S controllers are designed to provide high performance solutions for workstations servers in environments where cost is a factor.

- Type: Ultra160 SCSI
- Host bus: 32-bit PCI
- Host bus transfer rate: 132 MB/sec
- I/O transfer rate: 160 MB/sec (Maximum supported transfer rate)

2100S controller features include:

- Adaptec 7892 Ultra160 SCSI controller chip
- One Ultra160 SCSI channel with internal and external connectors
- Intel i960RS processor (rated 80 MIPS) with built-in hardware
- XOR, PCI bridge, and DMA address translation
- 2 MB flash ROM
- 32 MB onboard memory expandable to 128 MB
- I2O messaging
- Audible failure alarm
- Hardware RAID 0, 1, or 5; supports striping multiple arrays as a single logical drive (RAID 0/1 and 0/5)
- Intelligent hot-spare capability
- Support for SAF-TE and SES
- 32-bit PCI bus
- Complies with PCI Local Bus Specification, revision 2.2; PCI clock speeds up to 33 MHz are supported.

Board Layout

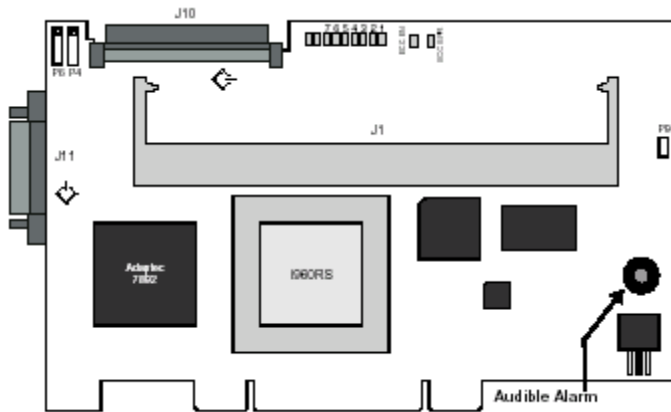


Table 2-1: Board Components

Item	Description
P4	Pins 1-2 NVRAM clear Pins 3-4 Misc (Reserved, do not use)
P6	Disk activity LED connector
P9	Pins 1-2 Retry (Reserved, do not use) Pins 3-4 Reset (Reserved, do not use)
J1	168-pin DIMM socket
1...8, IRQ	Adapter activity LEDs
J10	Internal Ultra160 Wide SCSI connector (Bus 0)
J11	External Ultra160 Wide SCSI connector (Bus 0)

Cache Memory Module

SDRAM memory provides 32 MB, 64 MB, or 128 MB of high-speed disk cache for Adaptec SCSI RAID controllers. If ECC memory is installed, the cache is protected by ECC, which automatically repairs errors in the data. The green ECC Enabled LED is lit when ECC memory is installed. For the location of this LED, refer to “Board Layout” in this chapter.

Adapted SCSI RAID Controller LEDs

Adaptec SCSI RAID controllers provide nine LEDs that let you visually monitor controller activity. Several different controller states are indicated by the LED as outlined in the following sections. Two additional LEDs indicate the status of the cache memory on the controller. For the location of the LEDs on your controller, refer to “Board Layout” in this chapter.

LED Display During Power-Up

During its power-up sequence, the controller passes through the following states in sequence, as indicated by the LEDs:

NOTE: The address translation unit (ATU), PCI bridge, and cache module (if installed) must be configured and enabled before the I2O initialization can be completed. If any one of these components are not configured or become disabled during the Fast Idle phase, the pattern will return to the respective wait pattern for the affected component.

Table 2-2: LED Display During Power-Up

Condition	LED Display
Memory mapped I/O	LEDs 6 and 7 and LEDs 5 and 8 flash alternately while the controller waits for the host computer to initialize the ATU on the PCI bus.
Bridge	LEDs 5 and 7 and LEDs 6 and 8 flash alternately while the controller waits for the host computer to initialize its PCI-to-PCI bridge.
Fast idle	The controller enters a fast idle pattern while waiting for the I2O initialization commands after the address translation unit (ATU) and PCI bridge have been enabled.

LED Display During Controller Idle

When no commands are in progress and all bus activity has ceased, the controller enters the idle state. This is indicated by a rotating pattern in LEDs 1 through 8.

LED Display During Controller Active

When the power-up sequence is complete, viewing the LEDs can help you determine the operating status of the controller. These LED patterns are also useful for troubleshooting. For more information on interpreting LED patterns, refer to Appendix C, “Troubleshooting.”

Table 2-3: LED Display During Controller Active

LED	Function
1	Heartbeat. Indicates that controller interrupts are enabled and that the controller is alive. During controller activity, this LED flashes four times a second.
2	Indicates the occurrence of a non-maskable interrupt (NMI) to the I/O processor on the controller.

continued

Table 2-3: LED Display During Controller Active *continued*

LED	Function
3	Indicates the controller's internal operating system is in its idle loop.
4	Indicates that the controller's internal operating system is processing an interrupt.
5	Reserved for future use.
6	Indicates that the cache controller is using DMA to perform a data transfer.
7	Indicates the controller is generating parity information for a RAID 5 array (hardware XOR).
8	Indicates that there is a command on the SCSI bus. IRQ Lit only when the controller activates an interrupt on the host PCI bus.

Cache Status LEDs

Two LEDs on the Adaptec SCSI RAID controller indicate the status of the onboard cache RAM. For the location of the LEDs on your controller, refer to “Board Layout” in this chapter.

- The green ECC Enabled LED is lit when the installed DIMMs are ECC memory modules. This indicates that the controller data cache is ECC protected.
- The red ECC Error LED is lit when a correctable or non-correctable error has been detected in one of the ECC DIMMs. After the error has been corrected, the LED will be on until the controller is powered down. Cache failure information is recorded in the controller error log.

Installing Your Controller

Installation Overview

The process of installing a Adaptec SCSI RAID controller consists of the following steps:

1. Configure device IDs, cables, and termination for SCSI devices in the host system.
2. If you are expanding your cache memory, plug the appropriate modules onto the controller.
3. Install the controller and storage devices in the appropriate enclosures. Attach all cables between the controller and the storage devices.
4. Run Storage Manager on ROM (SMOR) by pressing **Ctrl+A** during system boot to configure the controller's SCSI termination and verify proper hardware configuration. You can also use SMOR to configure your storage subsystem and disk arrays.
5. If you are setting up the computer system for the first time, install the operating system on one of the controller's disk drives or arrays.
6. Install any required operating system drivers. During this process, you should also install any driver updates for your Adaptec controller. For additional information, refer to Chapter 4, "Installing Adaptec SCSI RAID Software."

Configuration

SCSI devices must be configured before use. This configuration process includes enabling or disabling SCSI termination for the devices and setting the SCSI IDs for each device.

Narrow and Wide SCSI

The SCSI devices you will be installing can be either Narrow (8-bit) or Wide (16-bit) SCSI devices. Wide SCSI disk drives allow data to be transferred at twice the rate of 8-bit devices. Some SCSI devices such as tape and CD-ROM drives still use an 8-bit interface.

The Wide SCSI bus is backward compatible with Narrow SCSI devices, allowing both types of SCSI devices to be used on the same controller. Narrow SCSI devices **must** be connected to Channel 0 which supports the 8-bit bus.

IMPORTANT: If you use 8-bit and 16-bit devices on a single 16-bit SCSI cable, Wide devices must be at the physical end of the bus. This ensures that the 16-bit signals are correctly terminated.

Attaching a single-ended SCSI device to an LVD bus will cause the bus to run at Ultra SCSI speed (20 MHz) for all devices.

Configuring Cables



CAUTION: The SCSI I/O ports supply 5V DC and are capable of delivering approximately 2A DC current. Ensure that the interconnecting cables used are adequate for this amount of current.

Adaptec SCSI RAID controllers have Wide SCSI busses with one internal and one external SCSI connector for each bus.

Internal and external SCSI cables, connector adapters, and terminators can be purchased from a supplier of your choice or directly from Adaptec through our online web store at

www.adaptec.com

Configuring SCSI Termination

The devices on each physical end of a SCSI cable must be terminated. Depending upon how you configure your system, you will either terminate two SCSI devices, or the SCSI controller and one peripheral SCSI device.

IMPORTANT: If you are using multiple SCSI busses on a single controller, each separate bus must be terminated.

SCSI termination for Adaptec SCSI RAID controllers is configured through the SMOR utility or from the Configure Host Bus Adapter window in Storage Manager. The controller has four possible termination settings.

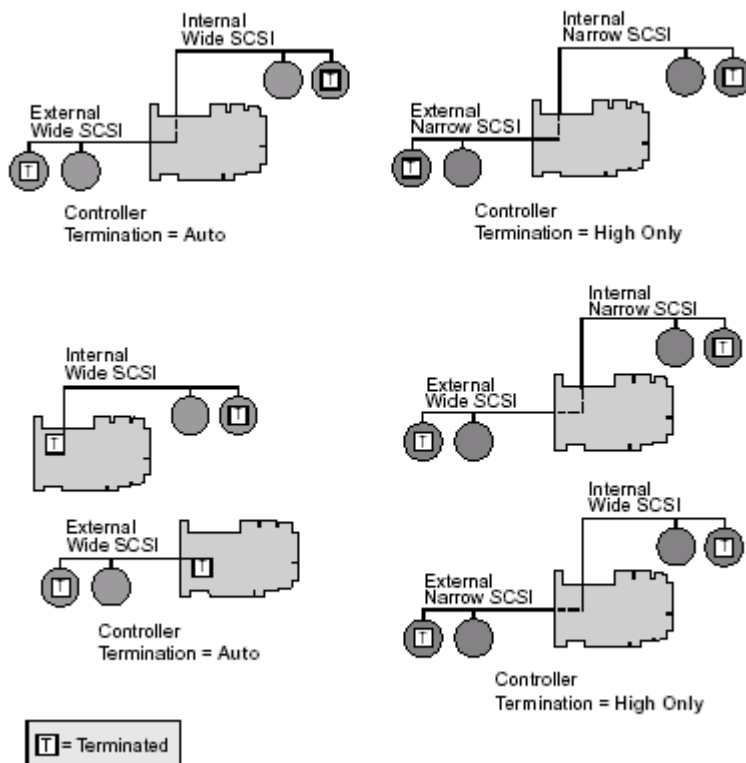
Table 3-1: Termination Settings

Setting	Function
Auto	The default setting. This setting can be used for all cabling conditions, except where two Narrow (8-bit) cables are attached or both a Narrow and Wide cable are used. For this case, use High Only.
Disabled	Turns off controller termination unconditionally.
Enabled	Turns on controller termination unconditionally.
High Only	Terminates only the additional signals that are used on Wide SCSI devices. This allows a Narrow cable or a Wide and Narrow cable to be simultaneously attached to the controller.

High Only termination is available only for devices on Bus 0. Devices on the second bus (Bus 1) must have 16-bit termination.

By using a 68-pin to 50-pin SCSI cable adapter, an 8-bit SCSI device can be attached to a Wide SCSI cable along with Wide SCSI devices. However, the device at the end of the cable must be a Wide SCSI device so that all SCSI signals are terminated. For internal and external cables where one cable is an 8-bit (Narrow) SCSI cable, set the controller termination to High Only.

The following illustrations show various SCSI cabling examples. Terminate your SCSI devices as shown in the examples, ensuring that only the devices at the ends of the cables are terminated.



Configuring Device IDs

The SCSI specification allows up to seven SCSI devices (and a controller) to be connected to a single 8-bit SCSI bus. A Wide SCSI bus can support up to 15 devices and the controller.

All SCSI devices, including the controller, must be assigned a unique SCSI ID. SCSI IDs, which are typically set using jumpers or switches on peripheral devices, can be assigned any number from 0 to 7 for 8-bit SCSI devices or 0 to 15 for Wide SCSI devices.

Set the SCSI ID of each SCSI device attached to the controller to a unique ID number between 0 and 6. The Adaptec SCSI RAID controller is set to ID 7 by default (most SCSI controllers use ID 7). Wide SCSI devices can also use SCSI IDs 8 through 15. SCSI IDs can be duplicated on the same controller if the devices using the same ID are not attached to the same bus.

If necessary, the Adaptec SCSI RAID controller ID can be changed to any ID 0 through 7. You can use SMOR to change the controller SCSI ID.

IMPORTANT: Changing the controller ID is not recommended. You should leave the Adaptec SCSI RAID controller set at SCSI ID 7.

Installation

The following sections describe how the components of your Adaptec SCSI RAID controller are assembled. Use these instructions in the event you need to add or remove a component.

Installing Cache Memory Modules

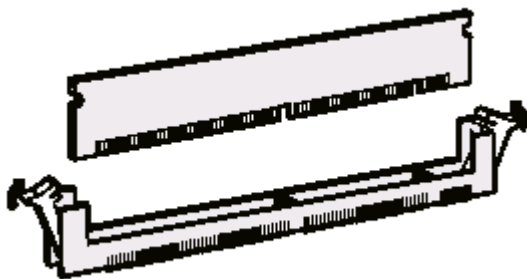
Adaptec SCSI RAID controllers support up to 128 MB of cache using onboard memory sockets. For specific information about memory modules for cache memory, refer to “Cache Memory” in Chapter 2, “About Your New Controller.”

To install cache memory modules:

1. Install the modules in the socket as shown. For socket location, refer to “Board Layout” in Chapter 2, “About Your New Controller.”

Press the DIMM firmly into the socket. Ensure that the clips are engaged in the notches on both sides of the DIMM.

2. To confirm that the modules are properly installed, start SMOR and select the controller to display the amount of cache memory reported.



Installing the Controller

1. Connect the computer's disk activity LED cable to connector P6 on the controller. For the location of this connector, refer to “Board Layout” in Chapter 2, “About Your New Controller.”
2. Pins 1 and 3 of P6 are connected to +5V and pins 2 and 4 are connected to GND. Ensure that the positive lead of the LED cable (usually a red wire or marked with a red stripe) is attached to pin 1 or 3 and the negative lead (usually a black wire) is attached to pin 2 or 4.
3. If you are using the internal SCSI cable, connect this cable to the controller.
4. Install the controller in an available 32- or 64-bit PCI bus slot and secure the controller bracket to the host system cabinet with the screw provided.
5. In a system with multiple controllers, the controller that has the lowest BIOS ROM address (typically, the lowest numbered PCI slot) will become the booting controller.

6. Connect any external cables to the controller.

IMPORTANT: If you have disk drives attached to a SCSI controller with a Symbios chipset, use SMOR to set the Bootable Devices option to **Disable**.

Determining the Booting Controller

Adaptec SCSI RAID controllers are shipped with an Adaptec I2O BIOS ROM enabled for PCI assignment. This ROM BIOS intercepts and processes Int13 BIOS calls with an embedded DOS driver.

The Adaptec I2O BIOS ROM can be disabled or the address changed automatically by the system's Plug-and-Play BIOS. In systems with multiple controllers, the first I2O controller found during boot loads its BIOS and installs all of the Adaptec hardware on the system.

Any additional Adaptec I2O controllers that are found automatically detect the presence of the first controller and disable their BIOS code. The disk controller that has the lowest BIOS ROM address (typically, the lowest PCI slot number) will become the booting controller.

Ensure that the Adaptec ROM occupies the lowest address if you want the Adaptec controller to be the booting controller in a system with controllers from multiple manufacturers.

Some system BIOS manufacturers select the smallest add-in BIOS as the first candidate, therefore slot selection has no effect on which adapter BIOS loads first. In this case, you need to disable the BIOS on selected adapters to control which adapter is the boot controller. This procedure can also be helpful in situations where it is physically difficult to manage the slot order.

Controller IRQ and Address

During the host system boot process, the host system BIOS should automatically configure the Adaptec I2O BIOS interrupt level (IRQ) and memory location for all Adaptec PCI controllers in the system.

If problems occur, refer to Appendix C, "Troubleshooting," for additional help.

NVRAM Reset

Adaptec SCSI RAID controllers retain their setup parameters even when powered off. These parameters are stored on the controller in an area of nonvolatile memory (NVRAM). There is a possibility that, through improper configuration, the controller can be put into a state where it hangs the system during boot. If this happens, the parameters stored in the NVRAM can be restored to their default settings by the following procedure:

1. Turn off power to the system.
2. Place a shorting jumper across pins 1 and 2 of P4 on the controller. For the location of P4 on your controller, refer to “Board Layout” in Chapter 2, “About Your New Controller.”
3. Power on the system and wait until LEDs 3, 5, 7, and 8 on the controller begin flashing.
4. Turn off power to the system and remove the jumper.
5. Restart the host system. If the system restarts normally, the controller can now be configured using SMOR.

If the system fails to boot, refer to Appendix C, “Troubleshooting,” for additional information.

Installing Adaptec SCSI RAID Software

Microsoft Windows 2000

The following sections describe procedures for installing Adaptec SCSI RAID controllers under Windows 2000. Two installation scenarios are described in this chapter:

- Installing on a new system
- Adding to an existing system

IMPORTANT: The driver for Windows 2000 does not include a digital signature. You may receive one or more warning messages about this condition. Bypass the warnings and continue with the installation. The driver will function normally when the upgrade or install is complete.

It is necessary to make adjustments to certain Adaptec 2100S RAID Controller setups to ensure uninterrupted service. This document describes these setups and presents corrective action.

Power Management with Windows 2000

Under Windows 2000, it is recommended that you disable Power Options while the Adaptec 2100S RAID Controller is building, rebuilding, or being verified. Otherwise, when the system enters Standby or Hibernate Mode, the Adaptec 2100S RAID Controller operation will stop.

When the system is restarted, the operation will restart from the beginning. To prevent this from happening, configure the Power Options feature to not enter Standby or Hibernate:

- To prevent the system from entering Standby, select **Start, Settings, Control Panel, Power Options, Power Option Properties, Power Schemes**, and then set **System Standby** to **Never**.
- To prevent the system from entering Hibernate, select **Start, Settings, Control Panel, Power Options, Power Option Properties, Hibernate**, and then deselect **Enable hibernate support**.

Installing on a New System

IMPORTANT: You only have a brief opportunity (five seconds) to press F6 during the install startup. A prompt will appear at the bottom of the screen when the **F6** key is active. If you do not press **F6** at this time, you must restart the Microsoft Windows 2000 install process to complete this procedure correctly.

1. Before you start your installation, insert the HP start-up CD on a Windows platform, and follow instructions for creating a driver floppy for the 2100S.
2. When the Windows 2000 installation starts, a blue screen will appear after the hardware detection message. When prompted to install a third-party driver, press **F6**.
3. When prompted, insert the driver floppy into your floppy drive and select **Adaptec I2O RAID Host Adapter Driver for Windows 2000**. Press **Enter** and follow the instructions.
4. When Windows 2000 starts for the first time it will start a New Hardware Wizard:
 - a. Click **Next**.
 - b. Select **Search for suitable driver for my device**.
 - c. Click **Next**.
5. Insert the driver floppy into your floppy drive. Select the floppy drive and click **Next**. The wizard should find the Adaptec SCSI RAID Adapter.
6. Click **Next** and follow the instructions to complete this part of the installation.

7. Install the Adaptec Management Controller device when prompted.

Completing the installation requires that the system shutdown and restart. When the restart is complete, continue with the following steps to complete the installation.

Adding to an Existing System

1. Follow the instructions for installing the Adaptec SCSI RAID controller in your system. Refer to Chapter 3, "Installing the Controller."
2. Before you start your installation, insert the HP start-up CD on a Windows platform, and follow instructions for creating a driver floppy for the 2100S.
3. When you start Windows 2000 the Found New Hardware Wizard will start for a SCSI/RAID Controller. Insert the driver floppy into your floppy drive. Select the floppy as the source, then click **Next**.
4. Click **Next** in the next two windows that appear.
5. Follow the on-screen instructions to complete the Adaptec SCSI RAID installation.
6. Install the Adaptec Management Controller device when prompted.

IMPORTANT: If you reset the NVRAM on the controller, any changes to your cache settings return to the factory default.

Regulatory Compliance Notices

Regulatory Compliance Statements

Federal Communications Commission Radio Frequency Interference Statement



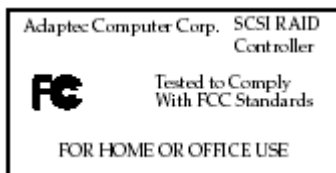
WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. However, if this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

- Use a shielded and properly grounded I/O cable and power cable to ensure compliance of this unit to the specified limits of the rules.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.



European Union Compliance Statement



This Information Technology Equipment has been tested and found to comply with the following European directives:

- EMC Directive 89/336/EEC, as amended by 92/31/EEC and 93/68/EEC
- EN 50081-1 (1992)
- EN55022 (1994) Class B
- EN 50082-1 (1992)
- EN61000-4-2 (1998)
- EN61000-4-3 (1998)
- EN61000-4-4 (1995)
- EN61000-4-5 (1995) Surges

Australian/New Zealand Compliance Statement



This device has been tested and found to comply with the limits for a Class B digital device, pursuant to the Australian/New Zealand standard AS/NZS 3548 set out by the Spectrum Management Agency.

Canadian Compliance Statement



This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Japanese Compliance (Voluntary Control Council Initiative)



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Adaptec, Inc.

Legal Department

691 South Milpitas Boulevard

Milpitas, California 95035.

Electrostatic Discharge

To prevent damage to the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be sure you are properly grounded when touching a static-sensitive component or assembly.
- When installing a component, use any available ejector levers or captive installation screws to properly seat the bus connectors in the backplane or card slot. These devices prevent accidental removal, provide proper grounding for the system, and help to ensure that bus connectors are properly seated.
- When removing a component, use any available ejector levers or captive installation screws to release the bus connectors from the backplane or card slot.
- Handle adapter cards by available handles or edges only. Avoid touching the printed circuit boards or connectors.

Grounding Methods

Several methods for grounding exist. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact your authorized reseller.

Troubleshooting

This appendix provides answers to many Frequently Asked Questions (FAQ). If a situation occurs that is not covered in this appendix, or if the recommendations here do not correct the problem, contact a technical support representative.

Problem 1

When the Adaptec I2O BIOS displays the peripheral devices at system boot, a device fails to appear.

Solution 1

The following conditions can cause this to occur:

- The device ID might be set to the same ID as the Adaptec controller (ID 7). Ensure that all devices have a unique ID.
- The device might not be powered on.
- The device is not connected to the SCSI cable or the connection is loose.

Problem 2

In addition to the Adaptec SCSI RAID controller, the system contains another manufacturer's SCSI controller and hangs during boot.

Solution 2

- The other controller fails to correctly implement extended BIOS data area (EBDA) usage rules. Use SMOR to try a different setting for the EBDA Relocation parameter or rearrange the controller slot assignments.
- If your system BIOS supports configuring the boot order, you can also try changing those settings.

Problem 3

The system contains another manufacturer's SCSI controller in addition to the Adaptec SCSI RAID controller. During boot, messages from each controller's BIOS appear, but one controller cannot communicate with its attached drives.

Solution 3

- The other controller fails to properly implement EBDA usage rules. Use SMOR to try a different setting for the EBDA Relocation parameter or rearrange the controller slot assignments.
- If your system BIOS supports configuring the boot order, you can also try changing those settings.

Problem 4

Microsoft Windows NT displays a blue screen error message that references the system video controller.

Solution 4

The video controller fails to properly implement EBDA usage rules. Use SMOR to enable the **EBDA Relocation** option.

Problem 5

The controller fails to respond and the IRQ LED (and possibly other LEDs) remains lit. For the location of the LEDs on the controller, refer to “Board Layout” in Chapter 2, “About Your New Controller.”

Solution 5

The IRQ LED indicates that the controller IRQ assignment is pending. This usually indicates an IRQ conflict with another card. Ensure that each card is set to a unique IRQ.

Problem 6

The controller does not respond and one of the following LED patterns occurs at power-up:

- LEDs 6 and 7 alternating with LEDs 5 and 8
- LEDs 5 and 6 alternating with LEDs 7 and 8
- LEDs 5 and 7 alternating with LEDs 6 and 8

Solution 6

- These patterns indicate that the controller is not being configured by the motherboard BIOS. Adaptec SCSI RAID controllers require a motherboard BIOS that supports multifunction devices, where one of the devices is a PCI bridge. All Adaptec SCSI RAID controllers require a BIOS that supports large memory-mapped address ranges.
- Refer to the Adaptec SCSI RAID `read.me` file on the Adaptec CD for information about motherboard compatibility and a list of motherboards that Adaptec has tested with Adaptec SCSI RAID products.

Problem 7

The controller fails to respond and one of the following patterns of LEDs flash once per second at power-up:

- 7, 6, 5, 2, 1 None
- 7, 6, 5, 3, 1 High
- 7, 6, 5, 3, 2 Mismatch
- 7, 6, 5, 3, 2, 1 Invalid

Solution 7

These patterns indicate a problem with the memory modules on the controller.

None—Either no memory modules were detected on the controller, or there is no module installed.

High—Too much memory has been detected on a controller. Remove memory so that the total is less than or equal to 128 MB.

Invalid—A memory module smaller other than 32, 64, or 128 MB has been detected. Use only 32, 64 or 128 MB capacity memory modules.

Problem 8

The controller fails to respond and various LEDs in the 1–4 range flash once per second.

Solution 8

This pattern indicates an internal microprocessor trap occurred in the controller. Remove all attached devices, cables and retry. If the trap error disappears, reconnect the cables and devices, one device at a time, until the faulty device or cable is isolated. If the error persists, contact your technical support representative.

Problem 9

Pressing **Ctrl+A** to access SMOR does not work or the information displayed is garbled.

Solution 9

If this happens, use the following procedure to restore the parameters in the NVRAM to their default settings:

1. Turn off power to the system.
2. Place a shorting jumper across pins 1 and 2 of P4 on the controller.
3. Power on the system and wait until the LEDs 3, 5, 7, and 8 on the controller begin flashing.
4. Turn off power to the system and remove the jumper.

You can now reconfigure the controller using SMOR.

Problem 10

You want the system to boot from a drive that is not attached to an Adaptec controller. However, during boot, the Adaptec I2O BIOS message appears first which indicates that a drive attached to an Adaptec controller will be the boot drive.

Solution 10

Use SMOR to disable the **Boot Enable** parameter for that controller. This will prevent the Adaptec controller from being used as the booting controller for system.

Problem 11

The Adaptec SCSI RAID controller I2O BIOS reports the drive as a disk instead of a drive.

Solution 11

This typically happens when a drive that is attached to an Adaptec SCSI RAID controller has been formatted with a sector size other than 512 bytes. Use SMOR to reformat the drive with 512-byte sectors. This can also occur if the drive is the 9th or higher logical drive attached to the controller.

IMPORTANT: Using SMOR to set Bootable Devices to Disabled as in the previous problem will result in the same symptoms. If you require access to disk drives connected to the Adaptec SCSI RAID controller during the boot process, change Bootable Devices to Normal.

Problem 12

Although the SCSI devices can be accessed by the Adaptec SCSI RAID controller, the fault LEDs on the devices in a RAIDstation storage cabinet do not flash during boot-up and the Adaptec SCSI RAID controller does not detect drive swaps or cabinet failures.

Solution 12

These symptoms indicate that the RAIDstation storage cabinet status signals are not being properly received by the Adaptec SCSI RAID controller.

For SAF-TE or SES: this can result from a failed enclosure monitoring module in the subsystem cabinet.

Problem 13

After updating the Adaptec SCSI RAID controller firmware or BIOS and rebooting, the adapter does not respond.

Solution 13

The update may have been unsuccessful. The controller is now in a state in which it hangs the system during boot. If this happens, the parameters in the NVRAM can be restored to their default settings using the following procedure:

1. Turn off power to the system.
2. Place a shorting jumper across pins 1 and 2 of P4 on the controller.
3. Power on the system and wait until the LEDs 3, 5, 7, and 8 on the controller begin flashing.
4. Turn off power to the system and remove the jumper.

You can now reconfigure the controller using SMOR.

Problem 14

After updating the Adaptec SCSI RAID controller firmware or BIOS and rebooting, LEDs 1 and 5 or 2 and 5 flash once per second.

Solution 14

These patterns indicate that the adapter startup code detected a firmware checksum error or a flash error. Attempt the firmware update procedure again by using the procedure in the following Problem description to recover from this condition.

Problem 15

A firmware upgrade is unsuccessful, causing the controller to hang.

Solution 15

The new firmware can be temporarily disabled and the upgrade attempted again by following the steps below:

1. Power-off the system.
2. Place shorting jumpers across pins 1 and 2 and pins 3 and 4 of P9 on the controller.
3. Insert the SMOR boot disk and power on the system. This will start SMOR.

NOTE: The SMOR boot disk image is available from the Adaptec Technical Support site. The download file contains the disk image and instructions for use.

4. Use SMOR to update the firmware. You must restore all three components of the flash ROM, firmware, I2O BIOS, and SMOR.
5. Power-off the system and return the jumpers to their original positions.
6. Insert the card in a host system PCI slot.
7. Remove the SMOR boot disk from your floppy disk drive and power-up the system.

Problem 16

After an upgrade of the I2O BIOS only, pressing **Ctrl+A** at the system prompt displays the message:

Card not configurable.

Solution 16

Perform a full firmware upgrade for SMOR to correct this condition.

Problem 17

The floppy disk drive cannot be accessed after installing an Adaptec controller.

Solution 17

Use SMOR to enable the **EBDA Relocation** option.

Problem 18

The controller's audible alarm is sounding during normal operation.

Solution 18

This indicates a drive has failed. Restart the host system and run SMOR to identify the failed drive. The alarm will stop when SMOR finishes the initial system scan. Replace the failed drive and start a rebuild operation for the array.